May / June 2005

VECTOR

Pointing to Safer Aviation

Fog

Fuel Gauges

MBZs, SPAs, and UNICOM

Twin Trouble

CAA
CIVIL AVIATION AUTHORITY OF NEW ZEALAND

VECTOR CAA NEWS

Published by: the Communications and Safety Education Unit of the Civil Aviation Authority of New Zealand, P O Box 31–441, Lower Hutt, New Zealand.
Tel: +64–4–560 9400, Fax: +64–4–569 2024,
Email: info@caa.govt.nz. Published six times a year, in the last week of every odd month.

Manager Communications: Bill Sommer.

Editor: Peter Singleton.

Publishing Team: Gareth Clare, Pam Collings, Cliff Jenks, Peter MacDonald, Jim Rankin, Anna Walkington, Rose Wood.

Design: Gusto Design & Print Ltd.

Publication Content

Unless expressly stated as CAA policy, the views expressed in *Vector/CAA News* do not necessarily reflect the policy of the Civil Aviation Authority. Articles are intended to stimulate discussion and nothing in *Vector/CAA News* is to be taken as overriding any New Zealand Civil Aviation legislation, or any statements issued by the Director of Civil Aviation or the Civil Aviation Authority of New Zealand.

Reader comments and contributions are welcome and may be published, but the Editor reserves the right to edit or abridge them, and not to publish those that are judged not to contribute constructively towards safer aviation. Reader contributions and correspondence regarding the content of *Vector/CAA News* should be addressed to:
Vector/CAA News Editor, P O Box 31–441, Lower Hutt.
Email: info@caa.govt.nz

Free Distribution

Vector/CAA News is distributed automatically to all New Zealand flight crew, air traffic controllers, aircraft maintenance engineer licence holders, aircraft owners, most organisations holding an aviation document, and to certain other persons and organisations interested in promoting safer aviation. In the case of flight crew and air traffic controllers, a current aviation medical certificate must be held, and a current New Zealand address given, to ensure magazine entitlement. *Vector/CAA News* also appears on the CAA's web site: www.caa.govt.nz.

Change of Address

Readers receiving *Vector/CAA News* free of charge should notify info@caa.govt.nz of any change of address, quoting your CAA Client Number. Paying subscribers should notify The Colour Guy.

Paid Subscriptions

Vector/CAA News is available on subscription only from The Colour Guy, P O Box 30-464, Lower Hutt, Freephone 0800–438 785.

ISSN 1173-9614

May / June 2005

CONTENTS

ALSO FEATURING

Publications Purchase

0800 GET RULES (0800 438 785) – Civil Aviation Rules, Advisory Circulars, Airworthiness Directives, CAA Logbooks and similar Forms, Flight Instructor's Guide.

www.caa.govt.nz, CAA web site – Civil Aviation Rules, Advisory Circulars, Airworthiness Directives, CAA application forms, CAA reporting forms. (Note that publications and forms on the web site are free of charge.)

0800 500 045, Aviation Publishing – *AIP New Zealand* Volumes 1 to 4 and all charts.

www.aip.net.nz, AIP Online – *AIP New Zealand* is available free on the Internet.

Cover: Fog in the Whanganui River, near Taumarunui. Photo by Craig Potton Publishing.

Photo courtesy of Mount Cook Ski Planes

Fog can cause major disruptions to aviation activity. In February, fog closed Wellington airport for six days causing disruption to thousands of passengers. Forecasting fog is not easy, as each incidence can vary slightly in its formation and dispersal. It is important, therefore, when planning a flight in weather conditions where fog may be present, or is present, en route or at your destination aerodrome, to obtain regular weather updates.

This article provides an overview on the types of fog, and a general description of the weather conditions associated with fog at a number of aerodromes around New Zealand.

What Is Fog?

Fog is simply cloud that touches the earth's surface. There are two main types of fog – radiation and advection.

Radiation Fog

Radiation fog forms when humid air next to the ground is cooled enough to reach its saturation point, and water vapour starts to condense into liquid droplets. This generally occurs on a clear night with light winds, usually under an anticyclone, but is highly dependent on the wind speed.

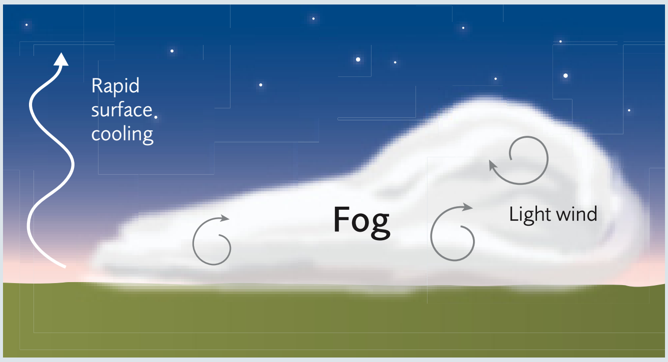
If there is no wind, then the water drops will fall from the air to sit on the surface as dew. Fog may form over grass areas, but it will only be a few metres thick.

If a light wind of four to five knots develops, then the air cooled by the ground will be mixed gently through a deeper layer of the atmosphere and the fog layer will thicken.

If the wind is too strong, the fog may be lifted above the surface and a low layer of stratus cloud will form, or the skies will remain clear.

Although radiation fog typically occurs during the night, it is not unusual for it to form after sunrise when the relative humidity has been high but when a lack of mixing during the night prevented its formation.

Radiation fog typically occurs at sheltered inland areas, and is thicker near moisture sources such as lakes and rivers. If it forms in hilly or mountainous terrain, then katabatic flow will intensify its development and will enhance the development of valley fog. This can flow down the valleys and gorges, and settle on low-lying areas.



Radiation fog can occur on a clear night with a light wind, if humid air is cooled enough to reach its saturation point.

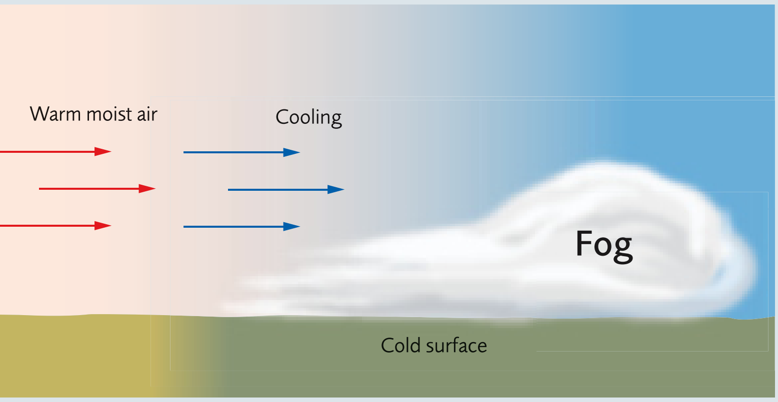
Advection Fog

Advection fog forms when moist air is transported (advected) over a surface that is sufficiently cold to lower the air temperature to its saturation point. It can form over water as well as land and is more persistent than radiation fog. It is not uncommon for advection fog to linger for an entire day.

Continued over ...

... continued from previous page

Unlike radiation fog, advection fog does not necessarily require anticyclonic or cold conditions. It may form if the air is stable and moist, and is blown across a sufficiently cold surface, provided the wind is not too strong.



Advection fog can occur when warm moist air is blown across a sufficiently cold surface to lower the air temperature to its saturation point.

Dispersal of Fog

There are a number of ways that fog can clear. Fog usually disperses when there is enough solar radiation to either directly evaporate the fog, or to mix the moist air within the fog bank with the drier air above. Fog can initially thicken for a short time after sunrise before dispersing. It may also clear if there is a change in wind direction and strength. This can occur with the approach of a front.

Fog also clears if there is insufficient moisture to replenish the fog as the water droplets that form it slowly fall to the ground due to gravity. Cloud moving over fog can also clear it by radiating heat downwards. For example, a layer of stratocumulus moving over Christchurch airport during a cold night can raise the temperature by more than 4 degrees Celsius.

Occurrence of Fog at New Zealand Aerodromes

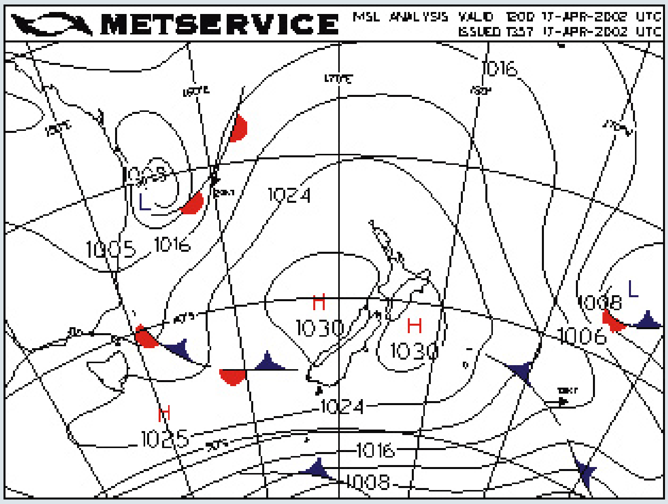
Fog can significantly affect aircraft arriving at or departing from an aerodrome. It can close an aerodrome, as we have seen recently at Wellington, resulting in significant disruption to operations. Fog can also hinder VFR cross-country flight by lingering in valley areas for the entire day(s), and closing access to inland aerodromes.

Auckland

Radiation fog is most common between April and late August, with anticyclonic conditions and clear skies at night. It usually forms in the early morning between 0300 and 0700 hours and clears around 0900 hours (all times are local). When fog coverage is extensive and covers the Manukau Harbour, clearance may be delayed until at least midday.

The onset and persistence of fog is influenced by the prevailing wind direction. When the wind is from the northeast, fog often envelops Wiroa Island (the small island south-east of the RWY 23 threshold) while the runway itself is clear, or is subjected only to patches of fog. With light west to northwest winds, fog normally forms initially over the Ihumatao sandbank. This fog usually forms earlier (between 2200 hours and 0300 hours) and spreads rapidly over the entire airfield. Its persistence is difficult to predict.

After sunrise, a temporary clearance may take place, but a substantial fog bank remains over the Papakura Channel, to the south of the runway. When warming of the land starts, and a gentle southwesterly sea breeze begins, this brings the fog back over the airfield. Under these conditions, the fog may persist into the afternoon.



Weather chart with fog occurring at Auckland. Note the very high pressure and the light winds ideal for the development of radiation fog during the early hours of the morning.

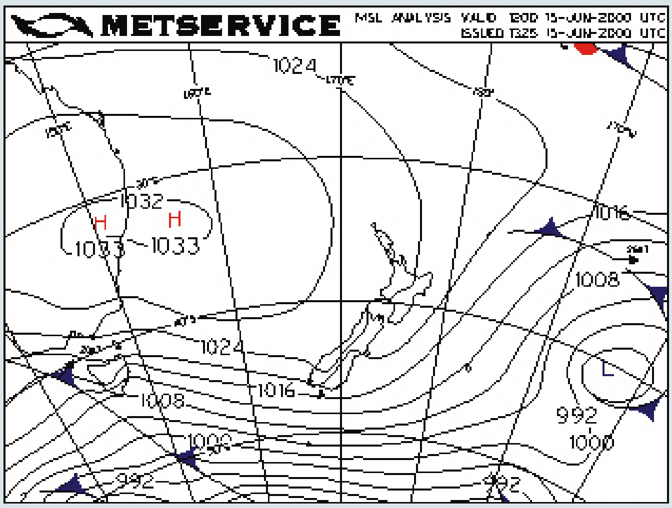
Tidal activity at Auckland can also influence fog. If there is a low tide during a clear night, then the exposed mud flats will lose heat quickly and there is a higher chance of fog forming.

Hamilton

Hamilton airport and surrounding areas are subject to fog all year round. Fog is more frequent from March to August.

Radiation fog forming in situ over the airfield is the most common. It is more persistent during the early stages of anticyclonic conditions when light westerly winds during the day have brought moist air from the sea to the Waikato area. In winter, fog can form as early as 2000 hours. During the night, the fog may be quite thin if there is little wind. In the morning, fog tends to thin temporarily shortly before sunrise but thickens again at sunrise, before clearing between 0900 and 1200 hours. This will vary depending on the time of year, and wind strength. This type of fog can cause frequent disruption to morning flying.

Early-evening fog will sometimes form if a front from the north or northwest crosses Hamilton in the late afternoon and is then



Radiation fog at Hamilton is more persistent during the early stages of anticyclone development over New Zealand.

followed by clear skies with light winds. The high surface humidity following the front, combined with rapid cooling after sunset, can result in sudden and widespread fog formation.

Although fog can frequently occur at the field, it is even more likely to occur near moisture sources, such as the Waikato River. In light easterly conditions, for example, fog will exist over the river to the east but not at the airfield. If the easterly becomes established during the morning after a calm night, fog can be advected onto the airfield. This is usually patchy, and clears during the morning.

Frontal fog forms occasionally in association with warm fronts moving in from the north. It is usually of short duration and clears rapidly when the front moves away.

Most fog situations (except thin radiation fog events) normally lift to a low stratus before clearing. Clearance is usually complete by 1200 hours but the development of stratocumulus above the existing layer of fog, or stratus, may delay the final clearance for some hours.

Tauranga

Radiation fog can occur all year around but is more common in the months of March to July.

It normally forms in the early morning and clears a few hours after sunrise. On occasions, advection fog can occur from the Bay of Plenty. This is associated with weather patterns which result in a moist, humid northerly airflow. Fog will also be extensive throughout the Bay of Plenty region in these conditions.

Gisborne

Radiation fog may occur during any month, provided there is a weak pressure gradient, clear skies, the dew point is high, and the katabatic wind fails to reach its normal strength. It is most likely to form if these conditions occur immediately after rain. This fog is usually rather shallow and patchy. Clearance is normally rapid after sunrise.

Taupo

Radiation fog can occur between April and August. Occasionally, humid northerly flows may bring stratus cloud to the airfield level as fog. Radiation fog normally forms in the early morning. At times, it will develop in the early evening, following the rapid clearance after a cold front. Fog normally clears within a couple hours of sunrise.

Although fog does form over the lake, as well as on land, it will tend to clear from the land first. The persistence of fog over the lake can cause operating problems at the airfield if an onshore drift occurs before the lake fog has dissipated.

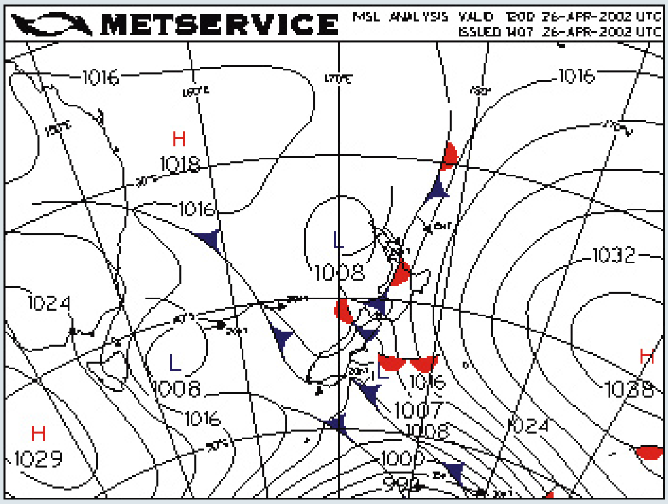
New Plymouth

Radiation and advection fog can occur at any time throughout the year.

Radiation fog is more common in the surrounding districts and valleys, although at the airfield it occurs on a few occasions during autumn and spring. In winter, the katabatic wind can be too strong for its formation. The fog normally forms in situ in the early morning, but on occasion it may drift from the area southeast of the airfield in light flows, and disperse over the sea. Fog normally clears by 0900 hours. At times, a ground fog may form in the late evening.

Advection fog is more common than radiation fog, especially during spring. This fog is advected from the North Taranaki Bight and occasionally is advected over the airfield. When it does so, this type of fog can persist for a few days.

Frontal fog sometimes forms when a warm front moves in from the North Taranaki Bight. It is normally of short duration, forming as the front reaches the airport and clearing rapidly as the front moves south.



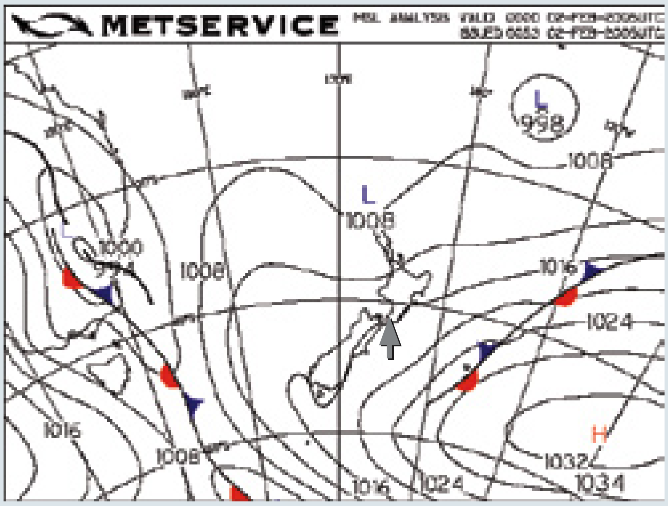
An occluded or warm front from the Tasman Sea can bring advection fog to New Plymouth. Note that anticyclonic conditions are not required for this fog to form.

Wellington

Advection fog occurs at Wellington when an intense and slow moving anticyclone is situated over, or to the east of, the Chatham Islands.

This advects warm air away from the tropics, which then crosses over a relatively cool ocean, and is cooled from below. As the moist air cools, its relative humidity increases to the point where low cloud, or possibly fog, is formed in the moist northeasterly flow to the east of Cape Palliser. This wind is an easterly across Palliser Bay, and if it turns to a southerly at the harbour heads fog and low stratus is advected over Wellington.

In this situation, as long as the wind stays from the east or southeast (indicated by the wind on Mount Kaukau) fog will not form at



Advection fog forms at Wellington when an intense and slow-moving anticyclone is situated over, or to the east of, the Chatham Islands. If the easterly wind turns to a southerly both at Mount Kaukau and Wellington airport, fog and low stratus is advected over Wellington.

Continued over ...

... continued from previous page

Wellington airport. The air will be crossing the Aorangi Range and the fog will remain on the upwind side. Wellington will remain clear. If the wind on Mount Kaukau backs to the south, then the protection from the hills is lost and the fog will roll in. This change, from southeast to the south, is associated with a very subtle change in the alignment of the isobars, and is therefore difficult to forecast.

Generally, if the wind on Mount Kaukau and at the airport changes from the southeast to the south the fog bank, which typically sits in Cook Strait during easterly conditions, will be advected over the airport. This fog can be very persistent, and may remain over Wellington airport for several days.

Occasionally, fog that forms in the Hutt Valley may be advected over the airfield under northeast conditions. This type of fog does not normally persist.

Hokitika

At Hokitika, very low stratus and fog over the sea to the west or northwest can advect over the aerodrome.

It is most persistent when it is associated with slow-moving fronts advancing from the west or southwest. These fronts are often preceded by a broad band of very humid north or northwest air, and followed by a rather stagnant onshore airstream. Such situations can give periods of fog lasting from 6 to 12 hours. Faster-moving systems will usually give only a few hours of fog.

Radiation fog clearing on the Canterbury Plains.

Christchurch

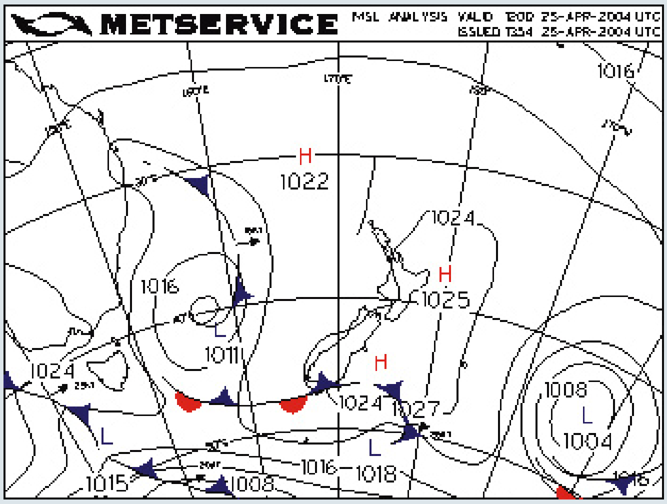
Fog is relatively common at Christchurch. It occurs most often during autumn to early spring. Fog which occurs during winter tends to persist longer than at other times of the year.

Most common is radiation fog that forms on clear nights when the pressure gradient is weak. Normally, this is associated with a northeast wind that has reduced to less than five knots, and has changed to a light northwest drift just prior to the development of fog. If the wind speed is below four knots, fog will form on the runways, but fog patches may occur over neighbouring grassed areas with wind speeds as high as eight knots. Interestingly, around half of the radiation fog events that form during the night clear before dawn.

During winter, if frost forms first, the onset of fog will be delayed by several hours, or it may not form at all. This occurs because the water vapour deposits onto the ice particles (frost). This maintains the vapour pressure below the level necessary for fog to form.

Christchurch also experiences advection fog. For example, when sea fog has formed over Pegasus Bay to the northeast of the airport, or over the Waimakariri River, it may be advected over the field. This fog usually lifts clear of the ground as it does so.

Fog advected from the Lake Ellesmere area to the south of the airport is less common but, when it occurs, is less likely to lift off the ground, and is more persistent.

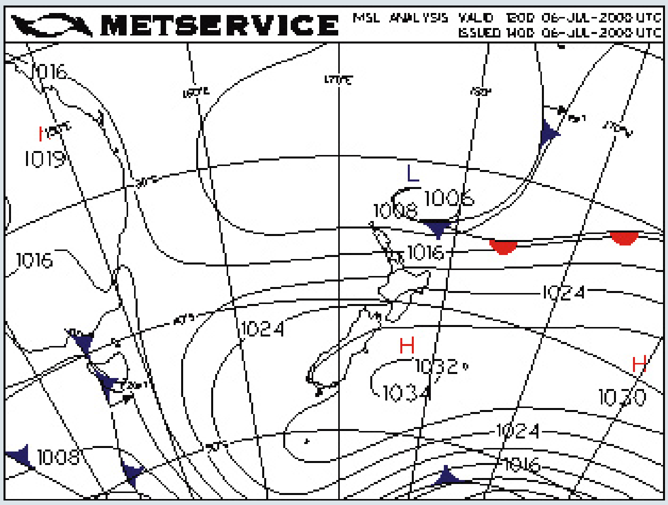


If an anticyclone is positioned to allow a light northeast flow over Christchurch, advection fog that has formed over Pegasus Bay may be advected over the airport.

Queenstown

Fog is not common over Queenstown aerodrome itself, but during anticyclonic conditions in winter valley fog will form in the surrounding basins. This can cut off VFR access routes to Queenstown and may not be apparent on weather reports, as the Queenstown METAR may indicate clear and fine conditions.

If fog does occur at Queenstown, it is typically around the aerodrome, and along the Kawarau and Shotover Rivers.



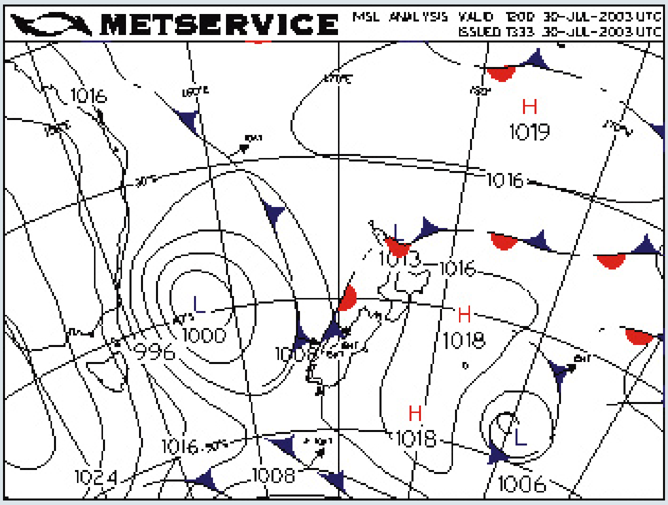
Valley fog in the inland areas of Central Otago can be very persistent, especially if there is a light easterly or southeasterly wind. In extreme instances, if the temperature of the fog is below zero the tiny water droplets remain liquid but will freeze if they come into contact with any object, such as a tree. This is known as freezing fog.

This may cover the thresholds of runways 23 and 32, thereby affecting the approach and overshoot on the reciprocal runways. This fog typically clears by late morning.

Dunedin

Radiation fog is common during autumn and winter. It is less likely during the windier months of spring and early summer.

Fog forms mainly between 0300 and 0600 hours, but on occasions as early as 2000 hours in the evening during autumn and winter. Fog usually persists until at least 0900 hours, and occasionally until late morning. When radiation fog affects the airfield, it is normally widespread over the Taieri Plain. The swampy areas and the lake areas to the south tend to have more persistent and thicker fog than elsewhere. On some occasions, if there has been no wind during the night, fog may form after sunrise when mixing occurs after the development of a light wind.



Radiation fog at Dunedin is most likely to form during autumn and winter.

Sea fog can reach the airfield, especially during winter in moist south to southeast flows. This occurs when the fog is widespread off the Otago and Southland coasts, and also covering the Southland plains.

Summary

In general, be on the alert for the occurrence of fog under the following situations:

- winter/autumn anticyclonic conditions with clear skies, weak pressure gradients and light winds
- in the early hours of the morning (fog may form or thicken after sunrise)
- at aerodromes near moisture sources, eg, rivers and swamps
- in conditions of high relative humidity, indicated on METARs and SPECIs by the ambient air temperature and dew point temperature being very close together.

Remember that timing of fog dispersal is very difficult to forecast. Radiation fog will usually clear by late morning, but advection fog is more persistent, and may last for the entire day, or even longer.

If you are flying to an aerodrome where fog is present, be prepared to divert to an alternative aerodrome, or to return to your departure point, in case the fog does not clear by the time you arrive. ■

GPS Database Omission!

Brian Souter, who contributed the articles on GPS use (see January/February 2005 issue of *Vector*), has subsequently found a potentially lethal omission on the electronic database of Garmin G1000 GPS units.

Single-engine Cessna and Diamond aircraft, equipped with the Garmin G1000 glass cockpit displays, do not show Kapiti Island when being used in the "topographical mode" on the navigation page. This could be bad news for a VFR pilot, unfamiliar with the area and proceeding off the coast near Paraparaumu in reduced visibility using their Garmin G1000 for situational awareness. The G1000 topographical display doesn't acknowledge Kapiti Island's existence! Kapiti Island is, however, included in the "terrain mode" database.

Garmin have acknowledged the omission, but have yet to advise the CAA of the revision date when Kapiti Island will be incorporated into the G1000 "topographical mode" database.

Be wary of electronic databases! Up-to-date hard copy charts are still vital for VFR navigation. Remember, having a GPS receiver on board is **not** an excuse to push your luck operating in marginal VMC conditions.

"Ag Work and the R22" Correction

On page eight of the March/April 2005 issue of *Vector*, we said that "The regular Beta for instance has a maximum manifold pressure of 23.7 in Hg and the Beta II only 23.5 in Hg at sea level on a 20 degree C day."

Thank you to an eagle-eyed reader (Neil Scott) who noted that the manifold pressure figure of 23.7 in Hg for the Beta model was incorrect. It should have read 24.7 in Hg. This can be found in the Flight Manual under Power Plant Limitations Charts 2.10 and 2.11.

The figure that *Vector* gave, was in fact the calculation for the R22 Alpha model.

Readers are encouraged to share their aviation experiences in order to alert others to the potential pitfalls. Please send your experiences to Peter Singleton, Editor, *Vector/CAA News*, Civil Aviation Authority, P O Box 31–441, Lower Hutt, or email info@caa.govt.nz.

Fuel Gauges

I'm a private pilot training for my CPL, with 53 hours pilot-in-command time on Cessna 152s. Having completed the first of the cross-country flights required for my CPL course, my instructor decided to send me on the next cross-country with another CPL student as passenger, who would give me a diversion along the way.

The planned flight was from Motueka to the Wanganui inlet (near Farewell Spit) and then down to Westport before returning to Motueka. Before leaving, I had given the aircraft the standard pre-flight check, as per the flight manual, and gave my passenger a briefing which included the route to be followed. We had full tanks (98 litres) and full oil. I taxied to the holding point and did my run-up and pre-takeoff checks, including checking that the fuel gauges showed the correct reading. I took off and headed out on my planned track.

Turbulence was encountered just south of Karamea, at a small township called Little Wanganui. My passenger decided that he wanted to go to Murchison instead of continuing down the coast to Westport (this being the excuse for the practice diversion). I carried out the standard diversion procedure and calculated how much fuel I had remaining to get to our new destination – 3 hours and 17 minutes. While tracking to Murchison, I did a SADIE check and observed the fuel gauges. The needles were swinging all over the place due to the turbulence, so I decided to check them again when we got back into smooth air. About 6 NM northwest of Murchison, we flew into calm air, so I again checked the fuel gauges and noticed that they were reading just under quarter full. Knowing that the fuel gauges were working before takeoff, I realised that I had used a surprising amount of fuel for our flight. Bearing this in mind, I decided it would be safer to follow the Buller River to Westport, just in case I had to do a precautionary landing into a paddock.

We made it safely to Westport, landed and taxied to the fuel pumps, where we shut the aircraft down and dipped the tanks. There was only 10 litres remaining in each tank. I checked around the aircraft with the help of another pilot (an experienced ag pilot) and with the assistance of an engineer via the cellphone. We could find no signs of leakage from any of the fuel drains, nor from around the fuel caps and other possible areas the engineer had suggested.

I called my instructor on the cellphone and asked what my best option was. As no fault could be found, the decision was made to fill the tanks and then to fly as far as Karamea aerodrome.

During the flight to Karamea, the gauges showed no unusual fuel loss. After landing at Karamea, I dipped the tanks again. This time, I found that the plane had used the normal amount of fuel. Judging that it was safe to continue the flight, I proceeded to fly back to our home aerodrome, where we landed and dipped the tanks again. The plane had again used the normal amount of fuel for the amount of flying done.

Back on the ground, I was asked by my instructor to work out the fuel consumption during the period from takeoff at Motueka,

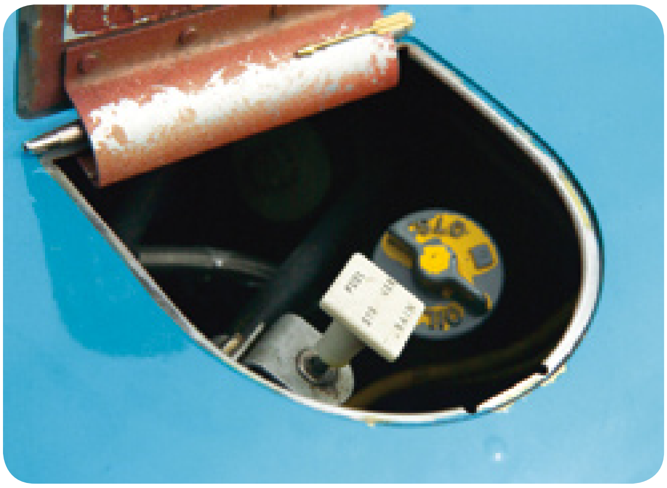
until we landed at Westport. This was calculated to be 36 litres per hour – compared to the normal consumption rate of 23 litres per hour.

From this experience, I learnt that it is **always** essential to do a thorough pre-flight check and take note of even the slightest defects. Know how much fuel you should have on board at any stage of a flight, and check the fuel gauges to make sure they are reading the correct quantity before lining up, because, although not always 100 percent accurate, they can still give you a good idea of how much fuel you have on board.

Nelson Aviation College Note

When the student returned from his cross-country flight, he told us as an aside, that the fuel strainer drain in the nose of the aircraft had needed to be pushed down (when he had checked it earlier), rather than returning by itself to the seated position.

It was subsequently noted in the incident report, that the likely reason for the fuel loss was the strainer drain had not seated properly after being checked – resulting in the subsequent loss of fuel – and may have re-seated in the turbulence that the pilot encountered.



Fuel strainer drain on a C152.

It was interesting to note that, when discussing this incident with other instructors in our organisation, most of us did not think that this defect would be serious enough to ground the aircraft – a mistake, and a learning experience for us!

This incident also shows that pilots need to check that drains are not leaking, after draining fuel.

We were impressed that the student:

- Checked the fuel gauges before departure. (Many pilots do not, because they think that they are unreliable!)
- Noticed that the fuel gauges showed less than they should have when carrying out a SADIE check.
- Made a good decision to fly to Westport and dip the fuel tanks.

Vector Comment

We thank Garth Fabbro for sharing this incident with us and endorse both his, and his training organisation's conclusions. Fuel gauges may not always be 100 percent accurate, but their indications should always be taken note of **unless** placarded unserviceable. Always make sure that strainer drains close properly after checking for fuel contamination. ■

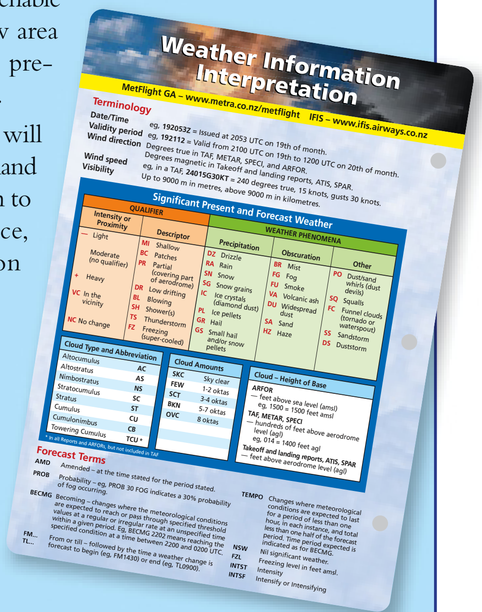
Weather Information Change

The GA WX (General Aviation Weather) forecasts for the North and South Islands, which are currently available when requesting weather information from Airways through IFIS (Internet Flight Information Service) or Fax-on-Demand, will no longer be provided by MetService after 9 June.

Airways have purchased the ARFORS (Area Forecasts) from MetService and these will be provided through the IFIS and Fax-On-Demand service after 9 June.

This change will bring in line the information available to non-commercial operators through the general aviation weather briefing system, MetFlight GA (sponsored by the Civil Aviation Authority of New Zealand), where ARFORS have been available for some time, and through the IFIS and Fax-on-Demand service (provided by Airways New Zealand).

A news item will be published on the IFIS web site in May. A link will be set up to enable pilots to view the new area pre-flight and specific pre-flight briefing screens.



New wallet-size cards will be sent to Fax-on-Demand subscribers. (If you wish to subscribe to this service, contact Administration Officer, Airways, Christchurch.
Tel: 0–3–358 1500
Fax: 0–3–358 2790).

The CAA has produced an updated version of the popular 'Weather Card' (to include ARFORS and other minor changes). It also includes the web site addresses for MetFlight GA – www.metra.co.nz/metflight and IFIS – www.ifis.airways.co.nz. The new card has three holes to allow filing in an AIP folder, if desired.

MBZs, SPAs, and UNICOM

Reports from airspace users and observations by CAA Flight Operations Inspectors have indicated that many pilots, when operating in a Mandatory Broadcast Zone (MBZ) or a Special Procedures Area (SPA), are not adhering to standard procedures, and are not applying good aviation practice in relation to using the radio.

Problems noted include:

- pilots neglecting to broadcast position and intention reports at regular specified intervals when operating within an MBZ
- pilots of joining aircraft making one call only, when entering an MBZ, then landing – no further position, or intention calls are broadcast
- pilots using only the last two letters of their callsigns, or no callsign at all
- using personal names instead of the three letter registration callsign
- pilots talking too quickly, particularly professional pilots
- unnecessary and irrelevant chat
- use of phrases that may not mean anything to an itinerant pilot transiting the area, for example, use of local reporting points instead of the standard ones depicted on the charts.

VFR and IFR pilots alike are reported to have caused problems by failing to make appropriate radio calls.

At uncontrolled regional aerodromes, such as Wanganui, there may be a tendency for pilots with Airborne Collision Avoidance System (ACAS) equipped aircraft to make one call only, before the MBZ boundary and then rely on ACAS for situational awareness of other aircraft. In many cases, calls are not being made on the downwind leg, final approach, or when clearing the runway. Similarly, when preparing for departure, it has been reported that some pilots are making a 'start and taxi' call, then nothing more is heard. Radio calls are not being made when taking off – nor are departure intentions being broadcast.

In parts of New Zealand where adjacent airfields use the same unattended frequency, confusion may arise if abbreviated radio calls are made that omit the aerodrome of use. Lengthy conversations in these areas can also effectively block the frequency for other users that you may not be aware of, possibly at another airfield.

If you wish to talk to the pilot of another aircraft about something not directly related to position reporting, (and you are in a suitable position that it will not compromise safety if you leave the relevant frequency) change to the recently promulgated aircraft-to-aircraft 'chat' frequency (for within the NZ FIR), 128.95 MHz, which you will find at the top of the list of Radio Communication and Navigation Facilities in *AIP New Zealand* Table GEN 3.7-1 under "All Aircraft". This will keep irrelevant chatter off the main frequency.

MBZ Operating Procedures

MBZs have been established to provide increased protection to aircraft in areas of uncontrolled airspace where high density traffic situations occur (such as major tourist areas) or where special operations occur (such as parachuting). In other areas, MBZs may provide additional protection for IFR aircraft carrying out an instrument approach. Some MBZs are transponder mandatory (TM) – for example, the upper portion of the Hokitika MBZ. This allows greater protection for IFR aircraft equipped with ACAS.

Position, altitude and intentions must be broadcast on the specific frequency when entering, and at regular specified intervals when operating within an MBZ. Time intervals are depicted in *AIP New Zealand* Table ENR 5.3-5, and on the Visual Navigation Charts. For example, the specified frequency for Wanganui MBZ is 120.2 MHz and broadcasts must be made at maximum intervals of 10 minutes. (See CAR, rule 91.135.)

For MBZs surrounding an aerodrome, the rule also specifies calls when joining the aerodrome traffic circuit and before entering a runway for takeoff. This does not mean that other normal circuit calls do not need to be made. *AIP New Zealand* ENR 1.1 para 6.2, Position Reporting at Unattended Aerodromes, lists the points at which pilots should broadcast their position, altitude and intentions. The list includes details for IFR and VFR aircraft.

In busy areas, such as those with high tourist scenic aircraft activity, keep position reports brief.

As an extra safety measure, landing lights and/or anticollision lights must be used when fitted.

Non-radio (NORDO) aircraft must not enter an MBZ unless they have another station, such as an ATS unit or an aircraft, broadcasting the required reports on their behalf.

MBZs are depicted on the charts with the designation Bxxx eg, Wanganui is NZB374. They are listed in *AIP New Zealand* Table ENR 5.3-5.

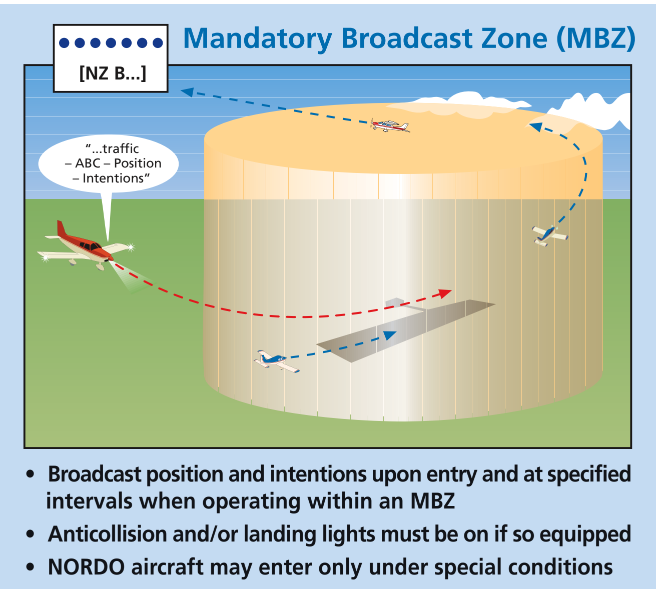
MBZ Radiotelephony Examples

Transiting the MBZ

- Kaikoura Traffic, XYZ, Hapuku 3000 feet, tracking south via the coast.
- Kaikoura Traffic, XYZ, Kaikoura township 3000 feet, tracking south, passing east of the airfield.
- Kaikoura Traffic, XYZ, Conway River mouth 3000 feet, tracking south.

Joining the Circuit

- Taupo Traffic, XYZ, White Cliffs 2900 feet, joining downwind for Runway 17.
- Ardmore Traffic, Piper Cherokee XYZ, Drury 1600 feet, tracking direct to join overhead for Runway 21.
- Ardmore Traffic, Piper Cherokee XYZ , Drury 1500 feet, descending to 1100 feet via Papakura to join right base Runway 03.



Continued over ...

The Ardmore UNICOM is located in the former control tower.

UNICOM

Some of the busier airports within MBZs have Universal Communication services (UNICOM). UNICOM is a ground-based radio service to aerodrome traffic that is designed to fill the gap between the provision of an aerodrome flight information service (AFIS) or aerodrome control service, and no service at all. It must be emphasised that a UNICOM service is not an air traffic service. This means pilots are fully responsible for maintaining awareness as to the whereabouts of other traffic, and for ensuring adequate traffic separation when operating in the vicinity of the aerodrome. Where a UNICOM station is present and on watch (operators often have other duties and may not be listening all the time), they may relay radio reports on the general location of aircraft known to them, but they are not able to interpret this information, and therefore, cannot provide traffic information.

For example:

… Reported traffic is Xray Yankee Zulu, who at 1105, reported 10 NM south at 1500 feet joining

… A light aircraft is observed approximately 3 NM north at low level

… A topdresser is reported to be operating low level 8 NM to the east.

Pilots may ask for surface wind conditions to ascertain a preferred runway but UNICOM service operators will not designate the runway-in-use.

For example:

Taupo UNICOM, XYZ, request surface wind conditions

XYZ, Taupo UNICOM, surface wind 360 degrees, 15 knots.

Information on meteorological and operational conditions may also be obtained from the AWIB.

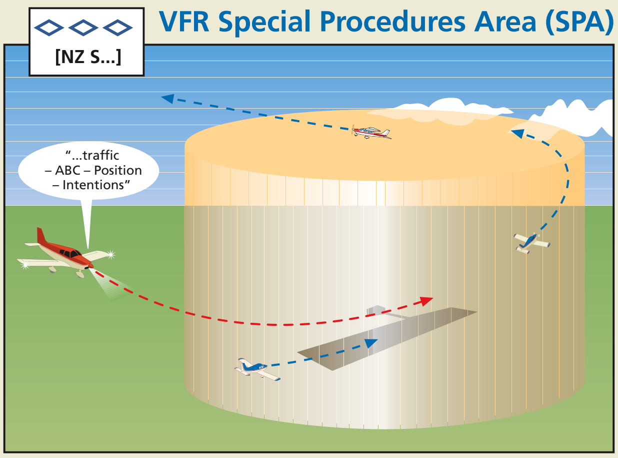
... continued from previous page

SPA Operating Procedures

VFR Special Procedures Areas (SPA) have been established in some areas to encourage pilots operating under VFR to establish communications on and monitor a single VHF frequency.

Although not mandatory, pilots are encouraged to establish communications in these areas. Keep radio calls concise, and use standard phraseology as much as possible. Avoid verbose accounts of your intentions, as these will only cause frequency congestion. In some parts of the country, there may be several adjacent areas and aerodromes using the same frequency.

VFR Special Procedures Areas are depicted on charts by use of the abbreviation SPA and a diamond-shaped boundary marking. They are listed in *AIP New Zealand* Table ENR 5.3-6.



- **Broadcast position and intentions if radio equipped**
- **Anticollision and/or landing lights should be on if so equipped**

SPA Radiotelephony Examples

- Canterbury Traffic, XYZ, Okuku, 2500 feet, tracking to Oxford.
- Fiordland Traffic, XYZ, South Mavora Lake, 5500 feet, tracking northeast via the Von.

Conclusion

CAA staff receive comments that there has been a deterioration in unattended airfield RTF standards, and that inappropriate phraseology is often being used. Adherence to standard RTF phraseology and procedures is necessary to avoid confusion and radio congestion. The use of non-standard procedures and phraseology can cause misunderstanding. Incidents and accidents have occurred in which a contributing factor has been the misunderstanding caused by the use of non-standard phraseology.

Correct and precise standard phraseology enables accurate information to be conveyed briefly in a predictable standard manner. This is of great assistance to other pilots attempting to establish accurate situational awareness. The safety benefits come through the 'see and avoid' principle that all pilots are trying to apply in the airspace in question.

If you think your radiotelephony standards may not be up to scratch, refer to the *Radiotelephony Manual* (Advisory Circular AC 91-9 and 172-1) for advice.

Be considerate, use your radio wisely and appropriately in an MBZ, or SPA, and display good airmanship. Where there is a UNICOM, use it to ascertain operational and safety information, but **remember**, responsibility for safe traffic management and appropriate position and intention calls remains with you – the pilot-in-command. ■

Phase-Out of 121.5 MHz ELT Monitoring and Processing

ELTs operating on 121.5 MHz are currently monitored by the COSPAS-SARSAT satellite-aided search and rescue system. (See May/June 2004 *Vector* article, "Down But Not Out.")

Due to the limitations of the 121.5 MHz ELT signal characteristics, and a high number of false alerts, the international agencies involved in search and rescue have agreed that satellite monitoring and processing of 121.5 MHz ELT signals will cease from **1 February 2009**. Thereafter, satellite monitoring and processing of ELT signals will be on 406 MHz only.

ELTs used in civil aviation will need to transmit simultaneously on 406 MHz and 121.5 MHz. The 406 MHz signal provides the initial alert and location processing by the satellite, and the 121.5 MHz signal provides the final homing for search aircraft.

The CAA is developing a Notice of Proposed Rule Making (NPRM) to amend relevant Civil Aviation Rules to implement this change, and informal consultation with industry is currently under way.

Anyone disposing of a 121.5 MHz only ELT, please ensure that it is **disabled** first – to prevent unnecessary Search and Rescue alerts.

Electromagnetic Interference from Wireless Internet Equipped Laptops

A recent report received by the CAA, of possible in-flight electromagnetic interference with an aircraft's navigational systems by portable electronic devices (PED), prompted the Director to write to all CAR, Part 119 Air Transport operators. To reach the wider aviation community, we have decided to publish the report in *Vector*.

From the Report

While in the cruise, "NOT ON INTERCEPT HEADING" was displayed on the Flight Management Computer (FMC). The Inertial Reference System positions were checked and found to be normal, but the FMC showed a track deviation 7 NM right of track. The autopilot had made no heading adjustment to respond to this and the flight director was commanding the existing heading. The nav display showed the magenta track [the track the aircraft should be on] to be to the right. Heading mode was selected to regain track, but LNAV (Lateral Navigation) would not capture. The Inflight Service Director was called and asked to check the passengers for electronic devices that could be interfering with the aircraft's systems. Two laptop computers with wireless LAN (Local Area Network) capability were found to be operating in the cabin. The captain required all electronic equipment in the cabin to be turned off, and the navigation discrepancy disappeared over the next 25-minute period. All indications and systems were in agreement by the next waypoint.

CAA Comment

Although the cause was not confirmed, this event is likely to have been caused by PED interference.

Many laptop computers are now equipped with built-in wireless Internet technology. Depending on the setup of the computer's operating system, this type of device could attempt to connect, and therefore transmit electromagnetic energy, as soon as the laptop is powered up. This has the potential to significantly interfere with aircraft systems in a manner similar to an active cellphone.

Civil Aviation Rule 91.7 *Portable electronic devices*, prescribes that "no person may operate, or pilot-in-command allow the operation of any cellphone or portable electronic device that is designed to transmit electromagnetic energy, on any aircraft that is operating under IFR".

To prevent electromagnetic interference with aircraft systems, in accordance with rule 91.7, operators should **actively** prohibit the use of wireless Internet equipped laptop computers while the aircraft is being operated under Instrument Flight Rules (IFR). ■

NEW BOOKLET –

How to... Be a Pilot

The *How to Be a Pilot* booklet has been revised and updated. To obtain copies, contact either your local Field Safety Adviser (see the advertisement in *Vector* for their contact details) or the Communications and Safety Education Unit.

Tel: 0–4–560 9400

Email: info@caa.govt.nz

Care to join the VECTOR team?

Do you have substantial aviation experience? Are you interested in writing? We have a vacancy in the Communicatons and Safety Education team producing *Vector* and other educational products – including the *GAP* and *How to*... booklets, posters, and videos.

Apart from your aviation knowledge, you will need to have a high standard of written and oral communication skills. If you also have presentation skills, there will be an opportunity to contribute to our safety seminars and courses.

For further details, keep an eye on the CAA web site, www.caa.govt.nz, under "Vacancies", and watch the newspapers.

TWIN TROUBLE

If your engine fails after takeoff, should you close the throttles and land straight ahead, or try to climb away?

This article by Stephen A Thompson was published in ***Flight Safety Australia****, March–April 2003.*

In 30 years of general aviation and airline flying, I had not experienced the slightest hint of an engine malfunction. Yet late one February afternoon in 1997, all my years of training for such an event were put to the test.

It had long been my conviction that the pre-takeoff briefings given by some multi-engine pilots were unduly pessimistic and lacking in understanding of the purpose and capabilities of multi-engine aircraft.

I well remember hearing a pilot about to depart from Essendon's Runway 26 in a Beech Baron state that he would close the throttles and land straight ahead if the aircraft suffered an engine failure below 400 feet agl. This seemed an unnecessarily risky course of action. More than 2000 metres of sealed runway is ample for such an aircraft to accelerate to V_{YSE} (best-single-engine-rate-of-climb speed) over the runway, thus placing the aircraft in a position where an engine failure can be managed while continuing the takeoff, obstacles considered of course.

There are certainly times when a total engine failure necessitates closing the throttles and landing straight ahead, but one is in a far better position to do this if the aircraft wheels are on, or very close to, the runway. In most twins, however, it is quite possible to maintain V_{YSE}, retract the gear, and feather, with as little as 100 feet between you and the runway.

The Incident

The company that I was working for at the time maintained an excellent standard in pilot training, as did TAA, a former employer, and it was through these agencies that I credit the happy outcome of what could easily have been a disaster at Gunpowder aerodrome in northwest Queensland.

The aircraft, a Beechcraft C90 Kingair, was fitted with autofeather, and I armed it prior to takeoff as per normal procedures.

The airstrip was 1300 metres long, of unimproved surface, and 800 feet above sea level. Because of rising terrain surrounding the strip, landings were only to be made on 27 and takeoffs on 09.

As a normal climb-out after takeoff would clear all obstacles with both engines operating normally, I rotated at 104 knots and retracted the gear at positive climb indication. Almost immediately, the left propeller autofeathered. I confirmed that the torque had fallen, carried out the phase-one actions, and checked aircraft performance. Airspeed was 107 knots and altitude was being maintained, but there was nothing in reserve to facilitate climb.

A quick glance up ahead at the rising terrain made me realise that the safest course of action was to manoeuvre for landing on 27 if that was possible. The other option was a controlled crash into timbered slopes.

The next three minutes or so seemed like an eternity. Terrain and timber flashed past the windows as I extracted all the circling room that existed in that little basin without banking so steeply as to induce a stall. This was one occasion when the wisdom of that requirement for all aircraft to have a serviceable stall warning device fitted and operating on every flight was driven home to me. There was little time to consider the effect of the angle of bank in that situation, and the intermittent sounding of the stall warning was a priceless benefit. Despite our periodic grumbling and some temptation to cut corners with equipment serviceability at times, the Civil Aviation Orders and Minimum Equipment List are worth their weight in gold.

On very short final there appeared some fat in the airspeed, and I lowered approach flap and gear. A few seconds after lock-down, I flared and landed. Reverse pitch on the good propeller was not much use due to the inducement of yaw, so medium-level wheel braking was all that was left to stop with. Fortunately, the touchdown was made with sufficient strip remaining.

Needless to say, my passengers (a doctor and nurse) and I were delighted to be back safely on terra firma. I was in no doubt as to the outcome if the aircraft had not had sufficient speed to maintain altitude and to manoeuvre at the time of engine failure.

My policy is, therefore, to remain on the runway until I reach single-engine-best-rate-of-climb speed unless obstacles dictate otherwise, in which case an engine failure would place us in the same situation as those in a single-engine aircraft – a forced landing.

Analysis

Flight Safety Australia Staff Writers' Comment

The most important task in any emergency is to 'fly the aircraft'. In the conditions, the pilot must have flown with considerable precision to manoeuvre the aircraft safely onto the ground, maintaining best-rate-of-climb speed and balanced flight in the process.

He had obviously pre-considered the engine failure case, and on this occasion had wisely decided that landing straight ahead was not a viable option while any better alternative existed. In this case, that alternative was to continue the takeoff and manoeuvre for a landing on the reciprocal runway. He flew accordingly, and achieved a satisfactory outcome.

The pilot's phase-one actions were the first critical step, designed not only to ensure maximum climb performance, but also to ensure that the engine had in fact failed. For example, a common reason for activation of autofeather on rotation is an insufficiently tensioned power lever friction nut. This can allow the power lever to be retarded by acceleration and vibration when the pilot's right hand moves to the gear selector, to a point where the reduced torque is sensed as an engine failure, and autofeather is activated. (If the engine is still operating, immediate movement of the power lever to maximum power, the first item on the phase-one checklist, restores power immediately, even if the propeller has stopped rotating.)

Checklist actions also include securing the shut-down engine. This guarantees maximum available performance and (in this aircraft) silences the undercarriage warning so it cannot be confused with the stall warning (which has a similar sound) so the pilot can concentrate on accurate flying with reduced performance.

The C90's flight manual indicates that a single-engine-climb gradient of (about) three degrees should have been available under typical temperature conditions with such a light load. It's all too easy to be wise after the event, and the prevailing circumstances of terrain and weather may well have supported the pilot's decision.

However, if an aircraft can maintain terrain clearance while turning through more than 180 degrees in (presumably) low-level turbulence, might there not have been an equivalent or higher possibility of climbing straight ahead, turning only enough to avoid the higher terrain, and flying to a more welcoming airfield?

Whatever the answers to those questions, reviewing any such incident gives all pilots an opportunity to ask themselves: "Given the known conditions, would I have made the same decision? A better one? Or a worse one? What are my criteria for aborting or continuing a takeoff?" And: "How well equipped would I have been to consider all the options at a split-second's notice?"

Reviewing such issues at leisure, and debating them with your peers and mentors, may well benefit you one day when the chips are unexpectedly down.

Vector Comment

The writer describes an incident in an aircraft which meets the performance requirements of Civil Aviation Rules, Part 125 *Air Operations – Medium Aeroplanes.* The Beech C90 has autofeather capability, and it is certified by the manufacturer to have a positive climb performance with one engine inoperative.

There are few aircraft in general aviation in New Zealand with autofeather. Light piston twin-engine aircraft, operating under CAR Part 135 … *Small Aeroplanes*, are not required to have a specific climb performance with one engine inoperative. Performance will vary with aircraft type, all-up weight, density altitude, and the condition of the aircraft. Decisions, therefore, need to be made taking all of these factors into account. ■

Takeoff and Landing Performance GAP

A revised edition of this popular GAP (Good Aviation Practice) booklet has been produced. Some minor changes have been incorporated.

Takeoff and landing are high-risk phases of flight, which currently account for more than 50 percent of all aircraft accidents in New Zealand. Most of these accidents involve similar elements: failure to get airborne in the distance available, collision with obstacles due to poor climb performance, failure to recognise a go-around situation, and overrun on landing – all of which are avoidable.

Takeoff and Landing Performance discusses the many factors that affect takeoff and landing performance and how to allow for them. This GAP shows you how to use a Flight Manual Performance Graph, and the Group Rating system (worked examples are included), to determine takeoff and landing distances.

This and other GAP booklets are available free from most aero clubs, training schools or from the CAA Field Safety Advisers. Alternatively, you can request them by email: info@caa.govt.nz or by telephone: 0–4–560 9400.

Visual Approaches

A *visual approach* can be requested by pilots flying under Instrument Flight Rules (IFR). This may provide greater flexibility, allowing them to fly a more direct flight path to the aerodrome, thus saving time. Do not confuse a *visual approach* with an approach under Visual Flight Rules (VFR). Do not confuse a *visual approach* with having achieved visual reference with the runway on completion of an instrument approach.

Controlled Airspace

The visual approach is subject to Air Traffic Control (ATC) authorisation when flying within controlled airspace, and it can take place either en route or during the instrument approach, provided that the following conditions as set out in the *AIP New Zealand* ENR 1.5 para 4.22 are met:

- By day, the pilot-in-command must have the aerodrome in sight and be able to maintain a continuous visual reference (including the pilot's responsibility to maintain terrain clearance).
- The pilot must, at all times, have the preceding aircraft in sight. Remember that the responsibility to avoid a collision applies to all pilots when flying in visual conditions.
- The cloud base must be above the applicable route minimum altitude or the initial instrument approach altitude – or the meteorological conditions encountered during the approach must permit a visual approach to be carried out, from which a landing can be made.
- At night, the pilot must have the runway lights in sight – approach lights, aerodrome beacon or runway end identifier lights **are not sufficient**.
- The visual approach must not be conducted below the minimum heights prescribed under rule 91.311 *Minimum heights for VFR flights* or, where applicable, under Civil Aviation Rules, Part 93 *Special Aerodrome Traffic Rules and Noise Abatement Procedures*.

During daylight hours, ATC may advise, or the ATIS may broadcast, that a visual approach can be expected. This occurs when the reported ceiling is at least 1000 feet above the minimum instrument approach commencement altitude, and the visibility is at least 16 km.

Note that ATC cannot issue these instructions at night – with one exception. The exception is for Christchurch Runway 11/29, when there is no reported cloud below 5000 feet and the visibility is at least 16 km.

An aircraft on a visual approach remains an IFR flight, and it is subject to ATC clearances for separation purposes.

When cleared for a visual approach, further descent is **unrestricted by default,** unless a **specific restriction is included in the clearance** from ATC. For example, it is common for a controller to place an altitude restriction on the descent, to provide separation from other aircraft. In this case, the restriction remains in force until cancelled by ATC.

Once cleared for the visual approach, and unless otherwise instructed, the aircraft can be flown via the shortest flight path to join finals for the runway in use. Crossing through the extended centreline on final approach requires ATC approval.

Visual Arrival

Christchurch and Wellington aerodromes have published *visual arrival* charts in the *AIP New Zealand*. The principles of a visual arrival are similar to the *visual approach*. The main difference is that, a visual arrival must be flown along promulgated tracks, and not below specified altitudes.

When approaching Christchurch during the day, with the cloud base above 3000 feet and visibility more than 8 km, pilots may request a visual arrival. Once authorised, pilots are required to conform to the direction and altitude restrictions for the published arrival. For example, if cleared for the "Coringa Visual Arrival for Runway 02", the pilots have to follow the set procedure; they cannot descend below 2000 feet until cleared by Christchurch Tower, as they may intrude on VFR aircraft flying within the control zone.

Uncontrolled Airspace

A visual approach can be flown at uncontrolled aerodromes. The conditions (*AIP New Zealand* ENR 1.5 para 4.23) are essentially the same as for controlled airspace:

- The pilot must be sure that visual reference to the terrain can be maintained.
- The ceiling is above the initial approach altitude, or the pilot is confident that meteorological conditions will permit a visual approach and landing to be carried out.

Caution: Do not commit to a visual approach too early – there may be cloud, obscured by terrain, between you and your destination.

Visual Departure

Visual departures can also be made from controlled and uncontrolled aerodromes. This is useful, for example, when crosswind conditions necessitate a takeoff from a secondary runway that does not have promulgated IFR departure procedures. The visual departure may allow greater flexibility and save time. Once airborne, however, pilots must intercept the cleared route as soon as practicable.

The visual departure also requires pilots to maintain terrain clearance to route minimum safe altitude (MSA), or to a specified altitude or point. Visual departures are, therefore, restricted to **day only**.

Conclusion

Visual approaches and departures can be useful, as they allow both pilots and controllers greater flexibility. The meteorological conditions must be suitable, and, if there is any doubt, the instrument departure or instrument approach should be flown. It is always possible to begin with the instrument approach, and request a visual approach once the conditions have been assessed as appropriate. ■

Product Survey

The Civil Aviation Authority has contracted Colmar Brunton to conduct a survey of our educational products. Colmar Brunton may contact you to ask if you would be willing to participate. If they do, they will require your email address to conduct the survey.

Please help us by taking part in the survey if you are contacted.

Field Safety Advisers

Don Waters
(North Island, north of line, and including, New Plymouth-Taupo-East Cape)
Tel: 0–7–823 7471
Fax: 0–7–823 7481
Mobile: 027–485 2096
Email: watersd@caa.govt.nz

Ross St George
(North Island, south of line New Plymouth–Taupo–East Cape)
Tel: 0–6–353 7443
Fax: 0–6–353 3374
Mobile: 027–485 2097
Email: stgeorger@caa.govt.nz

Murray Fowler
(South Island)
Tel: 0–3–349 8687
Fax: 0–3–349 5851
Mobile: 027–485 2098
Email: fowlerm@caa.govt.nz

Owen Walker
(Maintenance, North Island)
Tel: 0–7–866–0236
Fax: 0–7–866–0235
Mobile: 027–244 1425
Email: walkero@caa.govt.nz

Bob Jelley
(Maintenance, South Island)
Tel: 0–3–322 6388
Fax: 0–3–322 6379
Mobile: 027–285 2022
Email: jelleyb@caa.govt.nz

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT
(0508 222 433)

The Civil Aviation Act (1990) requires notification "as soon as practicable".

Aviation Safety Concerns

A monitored toll-free telephone system during normal office hours.
A voicemail message service outside office hours.

0508 4 SAFETY
(0508 472 338)

For all aviation-related safety concerns

OCCURRENCE BRIEFS

Lessons for Safer Aviation

The content of *Occurrence Briefs* comprises notified aircraft accidents, GA defect incidents, and sometimes selected foreign occurrences, which we believe will most benefit operators and engineers. Individual Accident Briefs, and GA Defect Incidents are now available on CAA's web site, www.caa.govt.nz. Accident briefs on the web comprise those for accidents that have been investigated since 1 January 1996 and have been published in *Occurrence Briefs*, plus any that have been recently released on the web but not yet published. Defects on the web comprise most of those that have been investigated since 1 January 2002, including all that have been published in *Occurrence Briefs*.

Accidents

The pilot-in-command of an aircraft involved in an accident is required by the Civil Aviation Act to notify the Civil Aviation Authority "as soon as practicable", unless prevented by injury, in which case responsibility falls on the aircraft operator. The CAA has a dedicated telephone number 0508 ACCIDENT (0508 222 433) for this purpose. Follow-up details of accidents should normally be submitted on Form CA005 to the CAA Safety Investigation Unit.

Some accidents are investigated by the Transport Accident Investigation Commission, and it is the CAA's responsibility to notify TAIC of all accidents. The reports that follow are the results of either CAA or TAIC investigations. Full TAIC accident reports are available on the TAIC web site, www.taic.org.nz.

ZK-NSC, Cessna A152, 4 May 00 at 15:40, North Shore Ad. 1 POB, injuries nil, damage substantial. Nature of flight, training solo. Pilot CAA licence nil, age 34 yrs, flying hours 18 total, 18 on type, 12 in last 90 days.

During the landing sequence, the student did not level the aircraft sufficiently, and the nosewheel contacted the ground before the main wheels. The noseleg folded back, but the aircraft came to a stop in an upright attitude. The student was uninjured.

Main sources of information: Accident details submitted by operator.

CAA Occurrence Ref 00/1650

ZK-NCA, Piper PA-31-350, 6 Jun 03 at 19:07, Christchurch Airport. 10 POB, injuries 8 fatal, 2 serious, aircraft destroyed. Nature of flight, transport passenger A to B. Pilot CAA licence CPL (Aeroplane), age 52 yrs, flying hours 4321 total, 820 on type, 82 in last 90 days.

On Friday 6 June 2003, Air Adventures New Zealand Limited Piper PA 31-350 Navajo Chieftain aeroplane ZK-NCA was on an air transport charter flight from Palmerston North to Christchurch with one pilot and nine passengers. At 19:07 it was on an instrument approach to Christchurch Aerodrome at night in instrument meteorological conditions when it descended below minimum altitude, in a position where reduced visibility prevented runway or approach lights from being seen, to collide with trees and terrain 1.2 NM short of the runway. The pilot and seven passengers were killed, and two passengers received serious injury. The aircraft was destroyed. The accident probably resulted from the pilot becoming distracted from monitoring his altitude at a critical stage of the approach. The possibility of pilot incapacitation is considered unlikely, but cannot be ruled out.

Main sources of information: Abstract from TAIC Accident Report 03-004.

CAA Occurrence Ref 03/1674

ZK-JET, Steen Skybolt, 21 Oct 03 at 18:40, Ararimu. 2 POB, injuries 2 fatal, aircraft destroyed. Nature of flight, aerobatics. Pilot CAA licence CPL (Aeroplane), age 28 yrs, flying hours 2637 total, 29 on type, 170 in last 90 days.

The aircraft was observed to be conducting aerobatics in the vicinity of Ararimu, south of Auckland. The last manoeuvre was a vertical climb. Towards the apex of this climb the aircraft entered a spin from which it did not recover. The aircraft was being operated at a weight exceeding the maximum all up weight allowed for aerobatics, with the centre of gravity on the aft limit. Due to airspace requirements and the minimum height above ground allowed by the rules, the pilot was operating where he had no legal vertical window in which to conduct the manoeuvres. A full report is available on the CAA web site.

Main sources of information: CAA field investigation.

CAA Occurrence Ref 03/2986

ZK-DUJ, NZ Aerospace FU24-950, 23 Oct 03 at 17:05, Bideford. 1 POB, injuries nil, damage substantial. Nature of flight, agricultural. Pilot CAA licence CPL (Aeroplane), age 55 yrs, flying hours 18520 total, 14590 on type, 82 in last 90 days.

The Walter-powered Fletcher agricultural aircraft was on the takeoff run on a steep airstrip when the turbine engine failed and lost all power. The aircraft was unable to be stopped in the remaining distance of the airstrip so the load was maintained aboard to prevent the aircraft becoming airborne. The aircraft was steered into a pine plantation to avoid overrunning into a steep bluff area. The engine was removed and sent to the engine manufacturer for repair. The manufacturer reported that the engine failure was due to a number of compressor turbine blades failing because of fatigue cracks.

Main sources of information: CAA field investigation.

CAA Occurrence Ref 03/3011

GA Defect Incidents

The reports and recommendations that follow are based on details submitted mainly by Licensed Aircraft Maintenance Engineers on behalf of operators, in accordance with Civil Aviation Rule, Part 12 *Accidents, Incidents, and Statistics*. They relate only to aircraft of maximum certificated takeoff weight of 9000 lb (4082 kg) or less. These and more reports are available on the CAA web site, www.caa.govt.nz. Details of defects should normally be submitted on Form CA005 to the CAA Safety Investigation Unit.

The CAA Occurrence Number at the end of each report should be quoted in any enquiries.

Key to abbreviations:

AD = Airworthiness Directive	**TIS** = time in service
NDT = non-destructive testing	**TSI** = time since installation
P/N = part number	**TSO** = time since overhaul
SB = Service Bulletin	**TTIS** = total time in service

Aerospatiale AS 350BA
Bleed valve

It was reported that the compressor stalled in flight after the bleed valve jammed in the closed position. In addition, two serious oil leaks were experienced. A new replacement bleed valve was installed and the oil leaks fixed. TSI 18 hours, TSO 18 hours, TTIS 18 hours.

ATA 7200 CAA Occurrence Ref 04/1044

Cessna 172M
Wing main spar

The main wing spar doublers, outer channel and several ribs, were found to be corroded beyond repair limits. The wings were completely disassembled and parts renewed as required. TTIS 6179 hours.

ATA 5700 CAA Occurrence Ref 04/83

Cessna 402B
McCauley propeller blade shank

During a scheduled inspection, red dye was noted on the ground beneath the righthand propeller. Further inspection revealed red dye leaking around the number two blade root dust seal. When the propeller was removed, dye was found mixed with engine oil. The propeller was sent to an overhaul facility who advised that the number two blade ferrule was leaking and also that the engine oil leakage into the hub was due to wear on the internal diameter of the repair bush. For McCauley propellers detailed in AD DCA/McCauley/144A, the relevance of the red dye modification required is demonstrated by its ability to not only detect cracks in the hub, but also reveal other defects, as shown by this occurrence.

ATA 6110 CAA Occurrence Ref 02/3177

Cessna 402C
Cylinder assembly

After takeoff, through 500 feet, a loud bang/pop was heard from the righthand engine accompanied by large power fluctuations. A precautionary landing was immediately made.

Investigation revealed that the head on the number one cylinder had completely separated. Other similar failures have been experienced with cylinders from the same source which were incorrectly heat-treated during manufacture. Consequently Airworthiness Directive, DCA/CON/186, was issued to require such affected cylinders to be removed from service.

ATA 8530 CAA Occurrence Ref 03/2345

Cessna A150L
Oil tank quick drain

It was reported that the pilot found engine oil coated over the tailplane and landing gear of the aircraft. The aircraft had just returned from a training flight in which there had been no abnormal operation or indications. Investigation revealed that components from the oil tank quick drain had come loose and had fallen away from the engine about six miles prior to landing. Only one litre of oil remained in the engine. TSO 70 hours.

ATA 7910 CAA Occurrence Ref 05/160

Eurocopter EC 130 B4
Saft battery

During testing of the temperature sensor, the 'C-D' contacts were found to be 'open-circuit' instead of temperature resistance variable. The sensor was dismantled, the thermistor legs soldered to the cables as required, and new shrink sleeves fitted. The manufacturer was advised that this is the third example of the same problem, and an assurance was obtained that such defects are viewed seriously and addressed accordingly.

ATA 2400 CAA Occurrence Ref 04/1722

Fletcher FU24-950M
Power turbine blade

During an engine ground run, after a fuel control unit adjustment, a loud explosion occurred. This was followed by the engine spooling down and lots of power turbine blade material coming out of the exhaust. The engine was shut down. The explosion was caused by a fatigue failure of the power turbine wheel and subsequent imbalance.

ATA 7250 CAA Occurrence Ref 03/273

Hughes 369D
Fuel cell

It was reported that an engine flameout was experienced following startup while 150-170 pounds of fuel was indicated to be on board the helicopter. Investigation revealed that the fuel cell had a crease or kink in it, which held the fuel indicator up from the tank bottom. This resulted from incorrect lacing of the bladder and caused the erroneous fuel quantity indications.

ATA 2810 CAA Occurrence Ref 04/3484

Schweizer 269C
Idler pulley bearing

On the approach, a noise was heard from the rear engine compartment. The subsequent investigation found grease had been thrown from the belt drive idler pulley aft bearing. Rotating the pulley revealed it was rough to turn, indicating a bearing failure. Both forward and aft idler pulley bearings and seals were replaced. Bearing appeared to have adequate grease, and it was of the correct type. TTIS 856 hours.

ATA 6200 CAA Occurrence Ref 04/1178